

middle in a transverse series; apex and a patch upon the outer margin sparsely mottled with ferruginous; fringe stramineous, spotted with brown at the ends of the veins; a slightly irregular discal series of brown-edged silvery spots; a blackish discocellular spot: secondaries with a clear, transversely elliptical patch just beyond the middle of the subcostal area; apex and some spots on the outer border sparsely speckled with ferruginous; fringe and silvery discal spots as in the primaries: body pale. Under surface of wings pale ochraceous, the mottling ill-defined, excepting upon the external third of the wings; pale patches as above; silvery spots obsolete; all the wings with blackish discocellular spots: body whitish. Expanse of wings 1 inch 11 lines.

Old Calabar.

*E. stellata* comes nearest to *E. ludovicata* (a common Malayan form), the pattern of the under surface being somewhat similar; it, however, bears a greater resemblance, in the colour and pattern of the upper surface, to the little genus *Stegania*.

*Ophthalmodes squalida*, n. sp.

Wings pale greyish testaceous, clouded with pale olivaceous and densely mottled with dark brown; the usual discoidal spots outlined in brown; a marginal series of black spots; two very ill-defined, parallel, sinuated, discal brownish lines; fringe and the costa of primaries testaceous, spotted with black: body pale brown, mottled with darker brown. Wings below with the basal two thirds sordid white, mottled with grey; discoidal spots dusky; external third fuliginous brown; fringes as above: primaries with a dusky line beyond the cell; costa yellowish, spotted with grey; apex and a spot on external border white: secondaries with a white apical spot: body very pale greyish brown. Expanse of wings 2 inches 3 lines.

Old Calabar.

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LII.—*Additions to the Crustacean Fauna of New Zealand.*

By T. W. KIRK, Assistant, Colonial Museum, Wellington, N. Z.

*Caprella lobata*.

A single specimen of this species dredged in Cook Strait in January 1876.

*Caprella novæ-zealandiæ*, sp. nov.

Cephalon furnished with a spinous tooth directed forwards.

First segment of pereion rather short, second long, third and following gradually decreasing. Superior antennæ two fifths of the length of animal; flagellum with the infero-distal extremity of each articulus produced, but without cilia. Inferior antennæ not so long as the peduncle of the superior by one joint. Second pair of gnathopoda articulating behind the centre of the second segment of the pereion; propodos ovate; palm armed with a prominent posterior tooth, and a smaller but distinct anterior tooth (not lobe); dactylos very much curved. Three posterior pairs of pereiopoda have the anterior margins excavate, the part against which the closed dactylos impinges armed with a tooth. Length 1 inch.

*Hab.* Cook Strait.

This species approaches *C. geometrica*, Say, from which it differs, however, in the form of the spine on the cephalon, in the length of the antennæ, and in the articulation and arming of the second pair of gnathopoda.

*Squilla indefensa*, sp. nov.

Rostral plate semioval and pointed at its distal extremity. Carapace retracted in front, expanded and rounded behind, smooth, the antero-lateral angles rounded and slightly produced forwards. Large prehensile limbs with terminal joint as long as the preceding one, and armed with *nine* spines (exclusive of the terminal one, which is very large). Abdomen smooth; terminal segment with six marginal spines and three depressed longitudinal ridges, which terminate posteriorly in spines. Length  $2\frac{1}{2}$  inches.

*Hab.* Chatham Islands and Kapiti.

*Porcellana rupicola*, Stimpson.

A single specimen obtained at Lyall Bay, Wellington, in May 1878.

*Xantho spino-tuberculatus*, Lockington.

A fine pair of this species was obtained at Porirua, near Wellington, by Mr. R. B. Gore, in January 1877.

*Ebalia tumefacta*, Mont.

A complete female and the right anterior leg of another specimen were obtained by dredging in Cook Strait in January 1876.

*Elamena producta*, sp. nov.

Carapace flat, broader than long; margin with two teeth,

or rather angles, which, however, vary much in size; rostrum very prominent. Anterior legs in male large, equal; hand and wrist much swollen, fingers curved and armed with hairs along their inner margin; in the female these legs are slight and their fingers almost straight. Ambulatory legs very flat; anterior margin of first joint produced so as to form a very prominent point, almost a spine; claws half the length of preceding joint. Whole animal destitute of hair, except on the fingers. First and second pairs of ambulatory legs very long, more than twice the length of the carapace. Breadth  $\frac{5}{8}$  inch, length  $\frac{4}{8}$ .

*Hab.* Wellington.

### LIII.—*Studies on Fossil Sponges*.—II. *Lithistidae*.

By KARL ALFRED ZITTEL.

[Concluded from p. 394.]

#### Family 4. *Tetracladina*.

AULOCOPIUM, Oswald, 1846.

(Schles. Gesellsch. für vaterl. Cultur, 1847, p. 58; F. Römer, Foss. Fauna von Sadewitz, 1861, p. 2.)

Sponge free (not attached), hemispherical, rarely globular or top-shaped, with impressed central cavity; lower surface coated with a wrinkled dense siliceous membrane. From the lower extremity of the central cavity numerous water-canals radiate to the periphery; curved canals of larger diameter, parallel to the contour line, open into the stomachal cavity. Skeleton formed of smooth, irregular, quadriradiate elements, each ray branched root-like at the end. These are usually arranged in rows so that the ramified ends of two neighbouring rows meet in a plane parallel to the radial canals, greatly enhancing the radiate appearance seen in a transverse section of the sponge-body.

The *Aulocopia* occur as chalcedonic pebbles in the North-German diluvium, especially on the island of Sylt. The microscopic structure is then generally well preserved, and may be shown in thin slices. In other places, as at Sadewitz, the whole sponge is filled with calc spar, and the originally siliceous skeleton converted into calc spar. The same unfavourable conditions prevail in specimens obtained *in situ* from the Silurian beds of Esthonia, sent by Prof. F. Schmidt of St. Petersburg. In those from Sadewitz the

upper part is sometimes calcified, and the lower, so far as the wrinkled membrane extends, converted into chalcedony. All the species are Silurian:—

1. *Aulocopium aurantium*, Osw., in F. Röm. Sad. p. 4, Taf. ii. fig. 1 a-c.
2. *Aulocopium diadema*, Osw. ib. p. 5, Taf. i. fig. 1 a-c.
3. *Aulocopium hemisphæricum*, F. Röm. ib. p. 6, Taf. ii. fig. 3.
4. *Aulocopium cepa*, F. Röm. ib. p. 7, Taf. ii. fig. 2.
5. *Aulocopium discus*, F. Röm. ib. p. 8, Taf. iii. fig. 1.
6. *Aulocopium cylindraceum*, F. Röm. ib. p. 9, Taf. iii. fig. 2.

#### PHYMATELLA, Zitt.

*Scyphia* p. p., Röm., Mich., Court.

*Siphonia* p. p., Reuss.

*Eudea* p. p., *Cylindrospongia* p. p., *Hippalimus* p. p., Röm.

*Polythyra*, *Hypothyra*, ? *Physocalpia*, Pom.

Sponge simple, cylindrical, pyriform, flask-shaped or nodular, sessile or long-stalked, with a deep central cavity reaching far towards the root, and near the base pad-like or nodular excrescences, separated by depressions, at which the wall is often broken through. Surface with numerous irregularly scattered circular or oval ostia of various sizes, from which simple radial canals pass into the wall. Similar horizontal canals commence near the surface, and open into the central cavity. Skeleton of regular quadriradiate corpuscles of considerable size, having the four main arms smooth and round, and their ends divided into several branches with short root-like processes. In well-preserved specimens the surface has a coat of elegant forked anchors; and among the corpuscles there are numerous uniaxial pointed or blunt spicules of various sizes.

Some species have a cylindrical stalk, 50–80 millims. in length, on which there are no ostia, but which contains vertical tubes and has a quite different microstructure. To the naked eye the stalk appears composed of long somewhat curved fibres parallel to the long axis. Under the microscope these fibres are shown to be long, distorted, Lithistid corpuscles, one ray being enlarged at the expense of the others, which are reduced to small lateral branches, which become weaker and weaker below. In the upper part of the stalk there are, between the fibres, small, indistinctly quadriradiate, strongly ramified, Lithistid corpuscles. All the species are from the Upper Cretaceous.

\*1. *Eudea intumescens*, Röm. Spong. xi. 1, *Cuvieri*-Pläner; Quenst. Petr. cxxxiii. 23-26.

\*2. *Cylindrospongia heteromorpha*, Röm. ib. viii. 11. *Cuvieri*-Pläner.

3. *Scyphia heteromorpha*, Röm. Kr. ii. 3. *Quadratus*-chalk.

\*4. *Phymatella bulbosa*, Zitt., sp. n. Polymorphous, strongly thickened and furnished with nodular excrescences at the base, stalkless. Central cavity of various widths. Tolerably frequent in the *Quadratus*-chalk of Biewende and in the *Mucronatus*-chalk of Ahlten.

5. *Spongites plicatus*, Quenst. Petr. cxxxiv. 1, 2. Pläner, Oppeln.

6. *Spongites tuberosus*, Quenst. ib. p. 388, cxxxiii. 18-20. Senonian.

7. *Hippalimus lobatus*, Röm. Spong. x. 1. Senonian.

8. ?*Hippalimus depressus*, Röm. ib. x. 2. Senonian.

\*9. *Siphonia elongata*, Reuss, Kr. xxxiv. 1. Cenomanian.

\*10. ?*Actinospongia dichotoma*, Röm. Spong. xix. 4. *Cuvieri*-Pläner.

11. *Scyphia trilobata*, Mich. Ic. xxviii. 2. Cenomanian.

12. *Scyphia attenuata*, Court. Ep. v. 2. Senonian.

13. *Scyphia perforata*, Court. ib. v. 3. Senonian.

14. *Scyphia conica*, Court. ib. v. 7. Senonian.

Also, perhaps, *Scyphia echinata*, *mammillata*, *sphaerica*, *coronata*, *digitata*, Court. ib. pl. vi. Senonian.

#### AULAXINIA, Zitt.

*Siphonocælia* p.p., Röm.

Sponge from elongate-pyriform to cylindrical, stalked. Vertex with a very shallow broad depression, from which run strong furrows, passing down the sides of the sponge to the beginning of the stalk. Interspaces about equal in breadth to the furrows, with rows of round ostia, from which canals penetrate into the dense sponge-body. Root without ostia, generally simple.

Body-skeleton like that of *Phymatella*. Forked anchors with long shafts and large bacillar spicules seem to indicate a special surface-layer. The root consists of very irregularly distorted quadriradiates, in which one arm is elongated and contains the axial canal; towards the lower end of the stalk the surface is covered with very long fibres, having numerous short lateral branches (Pl. VIII. fig. 2). In these, also, the axial canal is short and closed at both ends.



\*1. *Siphonocælia sulcifera*, Röm. Spong. xi. 7. From the Upper Cretaceous of Linden, Ahlten, and Dolberg, near Hamm.

### CALLOPEGMA, Zitt.

*Cupulospongia* p. p., auct.

Sponge basin- or funnel-shaped, sessile or short-stalked, thick-walled; outer surface with round pores; inner surface in the centre sometimes with larger oscula, from which vertical canals penetrate into the sponge. Skeleton coarsely meshed, loose, composed of large, rather regular quadri-radiates with smooth arms, the ends of which are strongly branched (Pl. VIII. fig. 1); the short canals of the four arms meeting in the middle. Surface, in well-preserved specimens, coated with forked anchors, their long shaft turned inwards. Also numerous bacillar spicules of different forms and sizes, and a few small anchors with recurved simple prongs.

Two species from the Upper Cretaceous of North Germany and Belgium.

1. *Callopegma acaule*, Zitt. Basin-shaped to hemispherical, either free or attached by a short wart-like stalk. Very thick-walled; in the bottom of the depressed upper surface several large round oscula. Outer wall porous. Under surface with some tubercles. Ahlten, Linden, Ciply.

2. *Callopegma Schlönbachi*, Zitt. Basin- or funnel-shaped; central cavity very wide and deep; attached by a broad base. *Mucronatus*-chalk, Ahlten.

### TRACHYSYCON, Zitt.

*Plocoscyphia* p. p., Röm.

*Sporocalpia* p. p., Pomel.

Sponge from ficoid to elongate-ovate, stalked, with a tubular central cavity, on the wall of which are the ostia of the rather coarse radial canals. Surface with conical pointed warts, from the apices of which fine furrows radiate. Stalk and lower part of the sponge-body smooth, furnished only with pore-like ostia, sometimes coated with a wrinkled siliceous membrane. Corpuscles large, irregularly quadriradiate. The four thick arms short and smooth, divided at the ends into several knotty branchlets.

1. *Trachysycon (Plocoscyphia) muricatum*, Röm. Spong. p. 20, x. 9. From the *Quadratus*-chalk of the Sutmerberg. Pomel refers to it under the name of *Sporocalpia*; but in this genus are united a true Hexactinellid (*Plocoscyphia morchella*, Röm.) and the present Lithistid.

## SIPHONIA, Park., 1822 \*.

*Caricoides*, Guett.*Siphonia* p. p., Park. et auct.*Choanites* p. p., Mant.*Hallirhoa*, Lamx.*Siphoneudea* and *Polysiphoneudea*, From.*Siphonia*, *Hallirhoa*, *Angidia* p. p., *Plethosiphonia*, *Polysiphonia*, *Pterocalpia*, ?*Physocalpia*, Pomel.

Sponge ficoid, pyriform or pomiform, sometimes rendered lobular by constrictions, generally simple, with short or long stalk, rarely stalkless. Vertex with a deep central cavity, on the wall of which are the round ostia of efferent canals, usually arranged in longitudinal and transverse rows. These rather wide canals are curved parallel to the outer contour of the sponge, but become more and more upright towards the middle, and finally vertical, being continued into the stalk and root as bundles of tubes. The curved canals decrease in size outwards, and commence at the surface in several fine tubercles, which unite and then run to the cloaca. Numerous smaller afferent canals run obliquely from within outwards, cross the curved canals, and commence at the surface in depressed round ostia.

Skeleton formed of large, distinctly quadriradiate corpuscles. The arms are smooth or slightly tubercular; their ends divide into two, three, or more branches with root-like processes. The corpuscles are usually arranged serially along the course of the canals; and their thickened and interlocked ends form regular radial bands †. Large bacillar spicules occur at the surface, in the canals, and in the skeleton; anchors with forked prongs are rare.

Many species of this genus change their form as they increase in size. Young specimens are generally cylindrical and traversed by nearly vertical tubes. The changes are figured by Sowerby (Geol. Trans. ser. 2, vol. v. pl. xv.) in *Siphonia tulipa*.

Externally *Siphonia* very closely resembles *Jerea*. The

\* Mr. Sollas has published a paper in the Quart. Journ. Geol. Soc. vol. xxxiii. p. 790, in which he treats of the structure and affinities of the genus *Siphonia*. The author remarks that he agrees with Mr. Sollas in all essentials, and that the latter has given fuller particulars on some points than will be found in the first section of the present memoir. The author separates *Jerea* from *Siphonia*, which Mr. Sollas has not done.

† The microstructure of the root agrees generally with that of the rest of the skeleton, except in the species with long stalks, in which the arms of the corpuscles, or one of them, are much elongated. See also Sollas, *loc. cit.*

sole distinction is the presence in *Siphonia* of a depressed central cavity, into which the ostia of the curved main canals open; but when the central cavity is broad and shallow, the canals also become more upright, and forms are produced which immediately approach *Jerea*. The structure of the skeleton is the same in the two genera.

This relationship of the two genera is reflected in the literature of the subject. Parkinson's diagnosis of *Siphonia* applies equally well to both; and among his species are two *Jereæ*. Of the three original species of Mantell's *Choanites*, two belong to the Hexactinellidæ; the third (*C. Königi*) is a *Siphonia*. In 'Medals of Creation' (2nd ed. pp. 230, 233), Mantell separates *Choanites* and *Siphonia*, distinguishing the former by the absence of a stalk furnished with tubes. By most subsequent authors *Choanites* is dropped and united with *Siphonia*. Cunningham, indeed (Institut, 1849, xvii. p. 14), finds generic distinctions in the deep central cavity and a supposed spiral canal; but no such canal is to be seen in the figures of Mantell and Dixon, or in specimens from England. Goldfuss, F. A. Römer, Reuss, D'Orbigny, &c. combine very different sponges under *Siphonia*; Courtiller refers to it a great many true *Jereæ*; while Fromentel and Pomel place the two genera in different families, and divide each of them into several genera. Parkinson's name is retained for these sponges, because it has been almost without exception employed for the typical species (e. g. *Siphonia piriformis*, *tulipa*, *ficus*, *nuciformis*, &c); and these species would certainly have been included by Parkinson under *Siphonia*. The genus is confined to the Cretaceous formation. The lobate forms may constitute a special subgenus (*Hallirhoa*, Lamx.).

A. Of typical *Siphoniæ* may be mentioned:—

1. *Siphonia piriformis*, Goldf. vi. 7 a; Mich. Ic. xxxiii. 1. Senonian.

2. *Siphonia tulipa*, Zitt. \*. Cenomanian, Blackdown.

*Siphonia piriformis*, Sow. Geol. Trans. ser. 2, vol. vi. pl. xv. a.

*Siphonia Websteri*, Quenst. (non Sow.), Petr. cxxxv. 15-19.

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\* This species, which is very abundant in the Greensand of Blackdown and Halden, has received a new name. It is generally united with *Siphonia piriformis*, Goldf., but is distinguished by the sudden constriction of the pyriform head immediately above the very long slender stalk, by the coarse curved and radial canals, and by the microstructure of both the head and the stalk. Quenstedt has separated it from *S. piriformis*, but identified it, erroneously, with *Jerea Websteri*, Sow., of which Sollas has lately given a good description and figures. *Siphonia Fittoni*, Mich., is more nearly allied to *S. piriformis*, Goldf., than to *S. tulipa*.



3. *Siphonia Geinitzi*, Zitt. Cenomanian.  
*Siphonia pyriformis*, Gein. Elbth. i. p. 38, Taf. 9, 10. fig. 4.
  4. *Siphonia bovista*, Gein. ib. x. 5, 6. Cenomanian.
  5. *Siphonia ficus*, Goldf. lxxv. 14. Senonian.
  6. *Choanites Kænigi*, Mant. Geol. Suss. xvi. 19-21. Upper Chalk.
  7. *Siphonia incrassata*, Goldf. xxx. 5. Senonian.
  8. *Siphonia nuciformis*, Mich. Ic. xxxiii. 4. ? Cenomanian.
  9. *Siphonia multioculata*, Mich. ib. xxxiii. 6. Turonian.
  10. *Siphonia arbuscula*, Mich. ib. xxxiii. 2. Turonian.
  11. *Siphonia ficoidea*, Mich. ib. xxix. 5. Cenomanian.
  12. *Siphonia acaulis*, Mich. ib. xxxviii. 2. Cenomanian.
  13. *Siphonia ornata*, Röm. Spong. x. 9. *Quadratus*-chalk.
  14. *Siphonia Morrisi*, Mant. Med. ed. 2, p. 254. Upper Chalk.
  15. *Siphonia Fittoni*, Mich. Ic. xxix. 6. Senonian.
- Also numerous, mostly ill-characterized, forms described by Courtiller, e. g. *S. decipiens*, *osculata*, *parasitica*, *sphærica*, *curta*, *cylindrica*, *intermedia*, *conica*, *rariosculata*, &c., many probably identical with previously described species.

#### B. Subgenus *Hallirhoa*, Lamx.

1. *Hallirhoa costata*, Lamx. Mich. Ic. xxxi. 3. Cenomanian.
  2. *Hallirhoa brevicostata*, Mich. ib. xxxi. Cenomanian.
  3. *Hallirhoa Tessonis*, Mich. ib. xxxiv. 1. Cenomanian.
- Here also probably *Scyphia alata* and *palmata*, Court.

#### JEREA, Lamx.

(Expos. Méth. p. 79.)

*Siphonia* p. p., *Jerea* p. p., auct.

*Manon* p. p., Goldf.

*Rhysospongia*, *Jerea*, *Cupulina*, *Siphonia* p. p., Court.

*Polypothecia* p. p., Benett, Mich.

*Jerea* p. p., *Rhizospongia* (*Rhysospongia*), D'Orb.

*Jerea*, *Polyjerea* p. p., *Rhizospongia*, *Rhizostele*, *Rhizogonium*, Pom.

Sponge pyriform, globular, reversed flask-shaped, conical or cylindrical, simple, rarely forming branched stocks, with a short or long stalk, and more or less thickened, sometimes dilated or branching base. Vertex truncate or with a depression, always with a number of round apertures, the orifices of a bundle of vertical tubes which traverse the whole sponge to its base, either perpendicularly or more or less parallel to

the outer surface. Surface with numerous, unequal, scattered small ostia, from which canals run to the centre of the sponge. These ostia gradually disappear on the stalk.

Skeleton composed of four-armed corpuscles of considerable size; the arms usually smooth near the point of union, but sometimes with blunt processes; their ends more or less branched, sometimes even enlarged into interlocked balls. In some species the arms, or some of them, divide into two main branches. Isolated forked anchors and simple bacillar spicules occur.

The genus was well characterized by Lamouroux in 1821. Goldfuss describes several species under the names of *Jerea*, *Siphonia*, and *Manon*; and Michelin also mixes *Siphonia* and *Jerea*; but D'Orbigny rather limits Lamouroux's conception, and separates the forms with a dilated root under the name of *Rhysospongia*. Such roots had previously been referred by Michelin to *Polypothechia*. Fromentel separated the compound forms as *Polyjerea*; and Courtyiller and Pomel divide *Jerea* into several genera. The former retains the name only for those with a truncate vertex; those with a depression form the genus *Cupulina*. Many true *Jereæ* are also referred by him to *Siphonia*, and those with a large root to *Rhysospongia* D'Orb. As the supposed epitheca of *Rhizospongia* has no existence, that genus is superfluous, as also *Rhizostele*, *Rhizogonium*, and *Rizogonima*, Pom. Pomel divides the compound *Jereæ* into several genera; *Polyjerea* is retained for the forms with basal proliferation, such as *J. cæspitosa* and *gregaria*, Mich., *S. ternata*, Reuss, &c.; *Callojerea* and *Dichojerea* are proposed for the branched forms, and, being founded solely upon external characters, include very heterogeneous elements.

The genus *Jerea* first appears in the Cretaceous, and possibly extends into the Miocene, if some of Pomel's species really belong to it. As typical species may be cited:—

\*1. *Jerea pyriformis*, Lamx. Exp. p. 79, lxxviii. 3. Cenomanian.

*Jerea pyriformis* and *elongata* p. p., Mich. Ic. xxxvi. 3, and xxxix. 4.  
*Jerea amygdaloidea*, Gûmb. Ostb. Grenzgeb. p. 771.

2. *Alcyonolithes stadensis*, Blum. Spec. Arch. Tell. ii. figs. 5, 6.

*Siphonia cucumis*, Menke, Jahrb. 1841, ii. fig. c.

*Siphonia Kraussi*, Hag.

*Jerea pyriformis* and *elongata* p. p., Mich. l. c.

*Jerea pyriformis* and *intricata*, Court. Ep. xxxiv. 2, 3.

3. *Jerea Quenstedti*, Zitt., *Quadratus*-chalk, Linden, near Hanover.

*Siphonia ficus*, Quenst. Petr. cxxxv. 20-23.

Allied to the above are :—

4. *Siphonia prolifera, clavata, acuta, polycephala, difformis, coronata, acaulis*, and *Cupulina elata, pocillum, latiosculata, glomerata, rhysospongioides, elongata, parallela, ficoidea, capitata*, and *acaulis*, Court. Ep. xxix., xxx.

5. *Siphonia ternata*, Reuss, Böhm. Kr. xvii. 1, 3. Turo-nian.

6. *Jerea excavata*, Mich. Ic. xxxiii. 3, xxxix. 2.

*Polypothecia pictonica*, Mich. ib. xxxvii. 1.

*Jerea tuberosa*, Mich. ib. xxxix. 3.

*Rhysospongia pictonica, pateræformis, cyathiiformis, vestita, crassa, elongata, semiglobosa, clavata, attenuata, truncata, costata*, and *digitata*, Court. Ep. i.—iv.

7. *Siphonia multiformis*, Bronn, Leth. Geogn. xxvii. 20. Peine.

### MARGINOSPONGIA, D'Orb.

(Prodr. ii. p. 187.)

*Alcyonium*, Lamx.

*Chenendopora* p. p., Mich.

*Marginojerea*, From.

*Marginospongia, Placojerea*, Pom.

Sponge cup- or funnel-shaped, stalked. Upper margin with numerous round apertures of tubular vertical canals, which traverse the whole wall and the stalk. Skeleton? Only in the Cretaceous.

1. *Alcyonium infundibulum*, Lamx. 1830 (teste D'Orb.).

*Chenendopora Parkinsoni*, Mich. Ic. xxxi. 1. Cenomanian.

2. *Marginospongia irregularis*, D'Orb. Prodr. Et. 22, no. 1500. Senonian.

? 3. *Jerea Desnoyersi*, Mich. Ic. xxxix. 1.

### NELUMBIA, Pom.

(Pal. d'Oran, p. 194.)

*Polystoma* p. p., Court.

Sponge clavate, stalked; vertex truncate or with a slight depression, covered with round ostia of vertical canals, which do not penetrate very deeply into the sponge-body. Sides with scattered depressions, into which open short, tortuous or straight transverse canals. According to Courtiller the sponge is sometimes covered with a delicate siliceous skin. Skeleton as in *Jerea*, of which this is perhaps only a section. The genus is limited to the Upper Cretaceous. Courtiller (*l. c.* pl. xv.) figures several forms, probably belonging to a single species, as constituting a section of his genus *Polystoma*.

## POLYJEREA, From., emend. Zitt.

*Jerea*, Mich.*Siphonia* p. p., Court.*Jerea* p. p., D'Orb.*Polyjerea*, *Dichojerea* p. p., Pom. (non *Polyjerea*, Röm.).

Sponge compound, tufted or branched, rarely simple, the cylindrical or barrel-shaped individuals often united at their base, with rounded vertex, in which are several apertures of vertical canals, which traverse the whole sponge-body. The base and the whole, or a great part, of the sponge covered with a smooth siliceous epidermis, beneath which are the ostia of the small radial canals. Skeleton, as in *Jerea*, chiefly composed of large, smooth quadriradiates, with branched ends; and of very small, elegantly filigreed, indistinctly quadriradiate, siliceous corpuscles, which lie close together at the surface and form the skin.

Increase takes place either by basal or by lateral budding, producing either bushy or arborescent forms. The distinction from *Jerea* consists in the small development of the radial canals and the presence of the epidermis. Nearly all Römer's species of *Polyjerea* belong to *Jerea*. *Polyjerea* is nearly allied to *Thecosiphonia*, in which, however, the epidermis is confined to the lower part, the individuals are larger, the vertical canals are much more numerous and open into a depression, and the radial canals are much better developed.

The typical species is very abundant in the Senonian near Evreux.

1. *Polyjerea ramifera*, Zitt., distinguished from *Jerea gregaria* and *cæspitosa* by the more distinct separation and furcation of the branches.

There also belong here:—

2. *Jerea arborescens*, Mich. Ic. xlii. 2 a (non 2 b). Senonian.

3. *Jerea gregaria*, Mich. ib. xxxviii. 1. Senonian.

4. *Jerea cæspitosa*, Mich. ib. lxi. 4. Senonian.

*Siphonia arborescens*, Court. Ep. xxiv. 2.

## ASTROCLADIA, Zitt.

*Siphonia* p. p., Mich.*Asterospongia* p. p., *Stellispongia* p. p., Röm.*Callojerea* p. p., Pom.

Sponge cylindrical, or arborescent by dichotomous ramification, massive, with no central cavity. Surface with a smooth (apparently dense) covering-layer, in which are distant oscula, which usually consist of some short fine tubes open-